U.S. Department of Energy
Electricity Advisory Committee Meeting
July 12, 2011

Meeting Minutes

EAC Members in Attendance:

Richard Cowart
Regulatory Assistance Project
CHAIR

Rick Bowen
Alcoa

Frederick Butler
Butler Advisory Services

Ralph Cavanagh
Natural Resources Defense Council

Honorable Robert Curry
New York State Public Service Commission

Lisa Crutchfield
National Grid USA

Jose Delgado
American Transmission Company (Ret.)

Roger Duncan
Austin Energy (Ret.)

Robert Gramlich
American Wind Energy Association

Dian Grueneich
Morrison and Forester LLP

Michael Heyeck
American Electric Power

Joseph Kelliher
NextEra Energy, Inc.

Edward Krapels
Anbaric Holdings

Barry Lawson
National Rural Electric Cooperative Association

Ralph Masiello
KEMA

David Nevius
North American Electric Reliability Corporation

Irwin Popowsky
Pennsylvania Consumer Advocate

Wanda Reder
S&C Electric Company

Brad Roberts
Electricity Storage Association

Honorable Tom Sloan
Kansas House of Representatives

Barry Smitherman
Railroad Commission of Texas

Richard Vague
Energy Plus Holdings, LLC

EAC Members Not in Attendance

Guido Bartels
IBM

Mike Weedall
Bonneville Energy Administration

Brian Wynne
Electric Drive Transportation Association

Gordon van Welie
Independent System Operator of New England

Public Attendees

John Shenot
Regulatory Assistance
Project (RAP)

Austin Montgomery
SEI

Kevin Messner
American Home Appliance
Manufacturers (AHAM)

Jeff Roark
EPRI

Jim Glotfelty
Clean Line Energy Partners

John Howes
Redland Energy Group

Praveen Kathpal
AES Corporation

John Holt
NRECA

Larry Camm
SEL

Travis Reed
Lewis-Burke Associates

Terry Williamson
PJM

Brian Nicholson
Electricity Storage Association

Kathleen Hamilton
Electricity Storage Association

Press Attendees

none

U.S. Federal Attendees

Honorable Cheryl LaFleur
Commissioner, Federal Energy Regulatory
Commission

Beth Ransel
BLM

Maria Wallace
GAO

Laura Henry
GAO

Kurt Longo
FERC

U.S. Department of Energy Attendees

Honorable Patricia Hoffman
Assistant Secretary for Electricity Delivery and Energy Reliability

Lauren Azar
Senior Advisor to Secretary Chu

David Meyer
Office of Electricity Delivery and Energy Reliability

Michelle Dellafiore
Office of Electricity Delivery and Energy Reliability

Gil Bindewald
Office of Electricity Delivery and Energy Reliability

Holmes Hummel
Office of Policy and International Affairs

Sam Baldwin
Office of Energy Efficiency and Renewable Energy

Lot Cooke
Office of General Counsel

Caitlin Callaghan
Office of Electricity Delivery and Energy Reliability

Cami Dodge
Energy Policy Analyst

Natalie Kempkey
Energy Policy Analyst

Ed Hoegg
Analyst

Energetics, Inc. Attendees

Peggy Welsh
Director, Electricity Program

Welcome and Opening Remarks

The Honorable Patricia Hoffman, Assistant Secretary for Electricity Delivery and Energy Reliability (OE), U.S. Department of Energy (DOE), opened the meeting by thanking everyone for attending and extending her appreciation for everyone's willingness to participate. *Assistant Secretary Hoffman's* comments were echoed by *Richard Cowart*, Chairman of the DOE Electricity Advisory Committee (EAC).

After EAC members introduced themselves, *Mr. Cowart* outlined the agenda for the meeting.

Federal Priorities at the U.S. Department of Energy

Lauren Azar, Senior Advisor to DOE Secretary Stephen Chu, presented the current priorities at DOE regarding electricity transmission and infrastructure.

Ms. Azar identified two priorities for infrastructure development. The first Doe priority is identifying and facilitating the removal of barriers to infrastructure development throughout the nation, particularly from delays from the Federal siting process. *Ms. Azar* stated that DOE has formed a "Rapid Response Team" for transmission siting to solve such issues. *Ms. Azar* stated that there since 2009 there has been a multi-agency endeavor under a Memorandum of Understanding to track and regularly update transmission projects, and federal permits are publicly available on the OE website. However, impediments approving transmission under the Federal siting process can arise from the lack of coordination of calendars between Federal and State agencies

In July 2011 Secretary Chu will hold a meeting to recommend six transmission lines as pilot projects for its Dashboard which will service as a multi-state siting process through a coordinated multi-state hearing process. *Ms. Azar* acknowledged that while the need for reviews are state specific, it is necessary to ensure that routes of the same lines within and outside of state lines match up. *Assistant Secretary Hoffman* agreed that the need is there for siting processes transparency is needed to provide information and coordination of timelines and deadlines and said that DOE can fill this role.

Ms. Azar then stated that the second priority being addressed at DOE is working more closely with and understanding the differences among Power Marketing Administrations (PMAs) –Bonneville Power Marketing Administration (BPA), Western Area Power Administration (WAPA), Southwestern Power Administration (SWPA), Southeastern Power Administration (SEPA). To understand the differences, *Ms. Azar* said that DOE is focused on building expertise within DOE career staff. She is working to establish a PMA team within DOE specifically for this purpose.

Ms. Azar next addressed the barriers to Research and Development (R&D). She stated that DOE is undertaking a significant amount of grid-related R&D. One grid-related R&D barrier is the stage at which technologies are ready for deployment. *Ms. Azar* stated that it is her role to help bridge the knowledge gap at DOE about which technologies are ready for commercialization and which technologies require further R&D. She also noted that it is important to educate regulators about technologies so that when regulators meet with utilities they have an understanding of which technologies are relatively low risk.

Finally*, Ms. Azar* noted that DOE is closely watching the emissions rules to be issued by the Environmental Protection Agency (EPA) and how those rules will affect reliability. She will be examining what response DOE needs to take and how DOE can help prepare the nation for EPA's rules, specifically where they impact the interface between electricity and natural gas.

Following *Ms. Azar's* presentation, the floor was opened for EAC members to express their views on the presentation. The discussion is summarized by topic below.

Increased Federal Oversight

Edward Krapels emphasized that the issue of oversight on EPA rulings was very complicated. He suggested that more DOE and federal oversight is helpful, especially to ISO-NE. *Michael Heyeck* suggested that if EPA rulings are implemented there might be litigation or appeals to delay the rules if they are not very clear, leading to a delay in implementing new technology in the sector. *Assistant Secretary Hoffman* noted that within OE there is a struggle with how long it takes to get new technology into the utility sector. She suggested that it is beneficial to look at rate recovery schemes and demonstration projects to gather more synergistic information sharing to accelerate deployment of new technology. *Assistant Secretary Hoffman* emphasized that information sharing, allowing the regulatory environment to be flexible is key to the process. *Ms. Azar* added that a quick transformation was needed, and that there was a need for new mechanisms for technology deployment.

Federal Energy Regulatory Commission's (FERC) initiative on the Intersection between Natural Gas and Electricity

The Honorable Barry Smitherman asked if *Ms. Azar* could elaborate on the interconnectedness between gas pipeline infrastructure and electricity.

Ms. Azar responded that a docket was recently opened to investigate the interdependencies between the natural gas infrastructure and the electricity infrastructure. She stated that the EPA rules could lead to fuel switching with more reliance on natural gas-fried units and possibly the development of new Carbon Capture and Sequestration (CCS) units. *Ms. Azar* concluded that there is a need to look at the build out of the natural gas infrastructure

Jose Delgado noted that the issues outlined by Ms. Azar seemed to be daunting list for DOE. He suggested that the coordination of federal agencies in reviewing transmission projects should be high on the priority list of these agencies. *Mr. Delgado* stated that the federal agencies could play a role in pushing this review and coordination, which could benefit industry tremendously.

Roger Duncan suggested that the emphasis should be on using the existing grid infrastructure more efficiently. He stated that this was not a research and development issue and that the necessary technology exists already. He noted that the range of grid operations/techniques from advanced to least advanced is wide. DOE has effectively helped with narrowing this gap. *Mr. Duncan* suggested that the focus should be in facilitating and spreading best practices to all, including the non-RTO areas.

Dian Grueneich responded that facilitating transmission permitting entailed federal coordination and state-federal coordination. *Ms. Grueneich* also stressed that the process should focus more closely on permitting of actual projects themselves, not only on the permitting of transmission lines. *Ms. Azar* agreed and noted that the DOE rapid response team for generation already was already in place. Right now this team is in database collection mode, not project specific mode. Eventually the goal is to meld transmission and project specific teams if these teams prove to be fruitful. *Ms. Grueneich* suggested that a rapid response team for interconnection could be formed, specifically for the permitting of lines and permitting of renewable energy projects. *Ms. Azar* noted that the development of transmission is longer than that of generation and as such there exists a need for developers to view these activities as a whole project, holistically.

Discussion on the Roadmap 2050 and Low-Carbon Options

Mike Hogan opened this next panel discussion by setting the context of the document. It was drafted in a political context where the when European Community (EC) had committed to 80% CO2 levels below 2050 and where the EC was concerned that a massive nuclear build-out was the only option. A sector-by-sector analysis was undertaken, including examining within sector (i.e., efficiency abatement, fuel switching to fuels with lower carbon content). He also noted that this Report was undertaken through modeling via "backcasting" so that the Report could look at solutions not necessarily determined by least-cost in order to assess changes that are not only incremental. Two of the major constraints included hitting the 80% target without fundamental technology breakthroughs and that the power system needed to be at the same level of reliability then as today.

Findings

Mr. Hogan stated that transport and buildings have the most potential for carbon reductions, which comes from electrification. He also noted that there was a surprisingly small difference in total cost between the three different pathways examined. The Report found that transmission is hard to build, but it is a cheap solution compared to the alternative (i.e. building renewable energy and curtailing generation). The Report also found that it is hard to move numbers dramatically in terms of cost, that no early retirements were necessary and plants could retire at the end of their useful economic lives, new inter-regional transfer capacity required was required, diversification in the portfolio related to increased interconnectivity across regions which made the generation portfolio easier to balance, and that the EC can operate system reliably with renewable with efficiency, demand response, not a foreseen result. Finally, the Report found that these efforts were massively beneficial or destructive to the growth of European economy.

Larry Papay's Comparison of the Studies:

Mr. Papay concluded that goals and objectives in the studies can be met. He stated that the electricity sector and transportation sectors would likely switch to a higher percentage of renewable energy and CCS. Bio-fuels were looked as being a substitution, not a primary source for power sector, but rather

primary for transportation. He concluded that energy efficiency is the obvious first choice with much money saved. The biggest "problem" is it this is undertaken by the user, not supplier. He noted that it is important to figure out how to incentivize the user to use investment for energy efficiency versus other discretionary spending.

Mr. Papay also pointed out that if the US does not overcome inertia for renewable energy technologies to build the industry, there is no hope of getting there. A problem with using fossil fuels is the adequate demonstration of CCS, to the extent that CCS can be absorbed price-wise into electric generation system. He concluded that based on the CEF report. We can get to 80%- deployment depends on policy and investment.

Lessons Learned

Need to start now

1. Existing infrastructure is valued in decades (trillions), not a quick turnover for generation/transmission;
2. Sliver buckshot, not silver bullet- need a portfolio of technologies;
3. Need to stay on course: portfolio approach is necessary for flexibility regarding unplanned events or natural disasters;
4. Policy and regulatory actions are important for deployment and integration;
5. Technology innovation and development are important.

Following *Mr. Hogan's* presentation and *Mr. Papay's* response, the floor was opened for EAC members to express their views. The discussion is summarized by topic below.

Discussion on the Generation Mixes in the Three Pathways Modeled

Ms. Grueneich asked what renewable energy mix between large utility and distributed generation is examined in the Report. *Mr. Hogan* responded that 50% of the photovoltaic was assumed to be rooftop, and the rest utility ground-scale. All solar thermal is assumed to be utility scale, but this was not examined in great detail as by 2050 the issue of renewable energy becomes less important from a transmission view point and more important to distribution.

Ralph Cavanagh asked about Germany's decision to not continue with nuclear energy and if Germany was planning on not building new coal facilities, but instead upgrading existing plans. He asked whether this change adjusted the Roadmap's conclusion or the short and long term impacts. *Mr. Hogan* responded that for the long term, it was almost unanimous that that 40% renewable energy (mix of 30% nuclear and 30% CCS) was no longer viable because of the situation in Japan. This was a dramatic shift from earlier phases. He stated that now the EC is focused on 50% renewable energy by 2030 to get to 50% renewable energy by 2050. In the short term *Mr. Hogan* said that there would be a switch to natural gas in Germany. To get to 50% renewable energy by 2030, gas was needed, but not as much as thought due to more flexibility in ramping, start up times, etc. *Mr. Cavanagh* followed up by stating that de-carbonizing implies a doubling of capital investment and expenditure for transmission and

distribution and questioned whether the EU utilities are ready to take on this role. *Mr. Hogan* answered that some already have some form of a capacity market and others are considering one.

Irwin "Sonny" Popowsky asked about the role of natural gas vehicles in the Report. *Mr. Hogan* responded that in 2050 the role of gas will be smaller as we transition to zero carbon because 80% of economy will not have a lot of space for gas in power or space heating. Between now and 2030 it will likely be that there is a significant role for natural gas. The role will be complementary as there will be a need for 50% renewable energy by 2030, 30% gas, the remainder coal. Natural gas will need to be more flexible, complemented by dual fuel operations.

Discussion of EC Policy

Mr. Delgado asked if there was any work performed on the feasibility of uniting state policy, and if so, what level of integration would be necessary to do so. *Mr. Hogan* responded that this level of regional planning implied is ambitious, compared to current integration levels. *Mr. Hogan* surmised that most likely different regions on their own will come to conclusion to work together and a transmission-EU plan. He has so far seen this effort develop, resulting in improved reliability and avoided capital costs.

Lisa Crutchfield asked about the economic regulation in the United Kingdom and how successful their long term planning for transmission was based on their economic rate plans over the last 8 years. She noted that this might create long term stability and financing for infrastructure. She also asked what the challenges in energy efficiency are and how to address them. *Mr. Hogan* responded that the challenges are the same as in the US regarding market failures and that most energy efficiency occurs through programs, not markets.

Discussion of Report Options' Financing

Mr. Hogan and *Barry Smitherman* had a discussion about natural gas prices, and the viability of CCS at this price. *Mr. Hogan* noted Europe will not see the same price impact from conventional gas because Europe does not have as many reserves as the US, so the price will be higher. In the Report, CCS and natural gas are assumed to play a larger role after 2030, after retrofits.

Michael Heyeck commented that the EU has national grids but it is weakly integrated. He stated that this might be an option for energy storage. *Mr. Hogan* agreed as that places such as the Iberian Peninsula need this reserve margin and that these margins are expensive and or/curtailment is expensive, so transmission is cheaper.

Mr. Krapels asked how to finance interregional connections in the US compared to the EU. He noted that the EU has a different paradigm- looking at ways to socialize interregional projects across the grid.

Discussion of Policy vs. Financial Incentives

The Honorable Tom Sloan asked if policy incentives equaled financial incentives. He noted that given the current economic national and state conditions incentives do not have to be financial. *Mr. Sloan* stated that the focus should be to reward first adopters and other non-monetary other factors in cost recovery. He noted that this has been true for energy efficiency conservation and as such programs are farther ahead in this area. *Mr. Papay* agreed stating that renewable portfolio standards started the renewable energy movement—not a financial push. He cautioned that consistency in policy is important and that a longer term policy was needed to provide stability to a growing industry.

Mr. Hogan stated that the discussion is around incentives and cost. He noted that it is necessary to make sure that the programs are designed to reach their goals at the lowest cost possible and with a review so that the least-cost providers can be reevaluated so as to as push deployments forward.

Mr. Cavanagh stated that in terms of motivation, are financial incentives the same in US and EU. He asked about methods to give incentives for people to invest in this financial environment. He proposed a discussion around the idea of auctioning off rights to feed-in tariffs in tranches over time to create competition among suppliers of renewable generation. He stated that this would drive down cost. And introduce more flexible mechanisms while still giving investor certainty.

Mr. Hogan commented on the importance of risk diversification. Assuming no fundamental technology breakthrough, the scenario does not get easier, and does not get cheaper. Diversification is an attempt to make achievability of an outcome as robust as possible. *Mr. Hogan* stated that the 40% renewable energy target proposed was not diversified enough because it assumes that the US will still build nuclear plants uninterrupted. *Mr. Papay* responded that there is no reason to believe that the grid would be all providing with all types of renewable energy. *Mr. Papay* stated that the future of the generation/electricity mix is unknown. However, he stated that the US does need to evolve transmission, generation, utilization of electricity because that is where technology will take us.

Assistant Secretary Hoffman answered that there is a need to focus on the objectives of security on contingencies and a reliability focus. She stated that while it might not be right the first try, there is value in the process of understanding the discussion around the scenarios and their resulting questions and conclusions.

White House Grid Modernization Report: Presentation and Discussion of Report on Smart Grid

Assistant Secretary Hoffman summarized that DOE undertook an education process with this report. The focus was on explaining the American Recovery and Reinvestment Act (ARRA) projects and what DOE intended to do with it and for what, if any, different future policies. She noted that the report clarified what the Smart Grid meant-to improve efficiency and operations of the grid first and foremost- then to utilize information technologies (via smart grid advanced sensing). She concluded that saying that there

were short and long term opportunities. In the short term there are better outage management, information for responding, reliability activities. In the longer term there would be the realization of state objectives for demand response and demand response for system operations.

Assistant Secretary Hoffman pointed to the following next steps:

1. Continue/expand technology assistance to states and Smart Grid recipients;
2. Create a Smart Grid Innovation Hub;
3. Build stakeholder meetings to understand regional diversity;
4. DOE will report on implementation in 6 months;
5. The Energy Information Administration will undertake initial efforts to track consumer access to energy usage information through its utility data collection mechanisms.

Following *Assistant Secretary Hoffman's* presentation, the floor was opened for EAC members to express their views on the presentation. The discussion is summarized by topic below.

Discussion on Smart Grid and Consumer Acceptance

Wanda Reder asked who was supposed to perform consumer education and outreach. *Assistant Secretary Hoffman* replied that it is the utilities, states, and associations.

Richard Vague stated that an issue of concern is how to make consumer use effortless to overcome initial inertia. *Assistant Secretary Hoffman* responded that as DOE looks at consumers, it's the educational process of generations to get more conscious with decision-making.

Discussion on Future Smart Grid Funding/Role of the Federal Government

Mr. Cavanagh noted that the ARRA funding is only a small fraction of total investment that is needed. He asked if there would be more federal money in the future, for if future funding was the responsibility of utilities and regulators. Further, he asked what was the most important role of the federal government in the future. *Assistant Secretary Hoffman* responded that the role is to help prioritize future investments given resource constraints. As the industry moves forward, the federal government should look at the value of what has been achieved with demand response. Secondly, look at how does rate-design achieve state goals and how can outage management be improved. *Mr. Cavanagh* replied that the federal government should mobilize its access to independent experts for credible experts to dispel negative Smart Grid public perception. *Assistant Secretary Hoffman* agreed that there is a DOE role for this. *Mr. Heyeck* added that a case report should be performed on the value of smart meter. He noted that DOE has large role in facts-based results.

Mr. Duncan stated that the role of DOE should not be to only promote technology, but as operational practices vary dramatically across the country DOE should put out information about deployment and how to promote lessons learned. *Mr. Sloan* stated that it would be useful for DOE to incorporate its national laboratories and other committees into the education of policy makers to clarify messages about the Smart Grid to the public. *Barry Lawson* added that the role for DOE should be to show consumers how they can save money on their electric bills with Smart Grid technology and programs.

Fred Butler and *Mr. Smitherman* provided a response to *Assistant Secretary Hoffman's* presentation.

Mr. Butler responded that the Report was well received and that the discussion regarding consumers is the keystone of the document. *Mr. Smitherman* responded that the Report did not focus enough on grid reliability. Like *Mr. Butler*, *Mr. Smitherman* also emphasized that there is a need to further educate and ensure the empowerment of consumers when using Smart Grid technology.

ACTION ITEM: Smart Grid Subcommittee should work to bring together Smart Grid studies and EIA data.

Smart Grid Subcommittee

Mr. Butler, acting as Subcommittee Chair for the Smart Grid Subcommittee, updated the EAC on the activity of the Smart Grid Subcommittee since the March 10, 2011, meeting. There has been one work product delivered- the review/update of 2008 EAC Smart Grid report detailing which EAC recommendations DOE had accomplished. DOE has accomplished or is working on all recommendations. The Smart Grid Subcommittee is also currently working on a review and commentary of what states are doing and a White Paper focusing on electric vehicle (EV) charging and impacts on the electric grid.

Mr. Cowart commented that there is a feeling that the public is not interested in Smart Grid. The objective in analyzing ARRA Smart Grid projects should be to look at these projects and ask, did consumers value the applications, or not? What applications will drive penetration of the smart meter and Smart Grid? *Assistant Secretary Hoffman* agreed that there is a need to determine how to define value for consumers and that the difficulty is understanding whether or not consumers understand how DOE is describing the potential benefits of Smart Grid.

Mr. Duncan suggested that the definition of Smart Grid is too broad and that it is a mistake talking about consumer education and consumers taking action when they do not understand how it works or its benefits. Instead, *Mr. Duncan* suggested that the focus be shifted to offering automated demand response, via third parties.

ACTION ITEM: The EAC should examine analyzing ARRA Smart Grid projects regarding how consumers have found value in these projects and make recommendations to DOE.

Energy Storage Technology Policy and Financial Development Presentation

Ake Almgren, from International Battery Incorporated, *Terry Boston* from PJM Interconnection and the *Honorable Cheryl LaFleur* from the Federal Energy Regulatory Commission (FERC) were invited to make presentations to the EAC the topic of energy storage. Their presentations are summarized below.

Presentation by the *Honorable Ms. LaFleur*

Ms. LaFleur summarized FERC's activities on energy storage.

February 2011 Notice of Proposed Rulemaking (NOPER) addresses changing compensation for electric energy storage:

- Requiring a payment for opportunity costs for units that were standing ready to provide storage.
- A market-based performance payment for the storage when that would measure the megawatts up and down (mileage payment) and on how closely storage actually matched the signal that came from the grid operator to reward for accuracy and to fairly compensate the fast ramping storage

June 2011 FERC issued a Notice of Inquiry on ancillary services bought, sold, and traded in the bilateral parts of the country:

- Should these restrictions be changed;
- Are there better ways to protect customers to create a more robust ancillary services marketplace across the country;
- Comment on how to count storage in FERC's accounting and financial report **.**

Presentation by *Mr. Almgren*

There are several criteria that have to be met when considering energy storage.

- Safe
- Reliable
- Clean
- Affordable

Mr. Algren emphasized that different energy storage technologies must be examined to determine where and how they apply on the grid.

Presentation by *Mr. Boston*

Mr. Boston stated that the system could be better optimized by optimizing grid devices. Energy storage is one such tool to use in optimizing the grid. The US residential load shape gives the opportunity and need for storage to optimize the differentials between off peak and on peak demand need. Energy storage is also essential to allow additional renewable energy integration into the grid.

Mr. Boston addressed several areas in which he thought policy could be further expanded upon. Most of the policy clarifications would center on the issue of needing efficiency in the device versus efficiency in the system. These areas included water heater storage standards, cost recovery, predictability of cost recovery for energy storage in long term markets and ancillary services

Following these presentations, the floor was opened for EAC members to express their views on the issues. The discussion is summarized by topic below.

Financing Energy Storage

Mr. Krapels asked if it might be appropriate to pay for these technologies along different time spans. *Mr. Boston* replied that market rules have been put into place to address this issue, but this has had more of an impact on the demand side rather than in the capacity market. *Ms. LaFleur* asked if the capacity market could be improved or differentiated for types of resources, noting that some resources develop longer than others.

Mr. Sloan addressed the issue of how to account for ratemaking in cost recovery. *Ms. LaFleur* stated that FERC looks at this issue on a case by case basis, designing markets to be resource neutral focusing on what cheapest, safest, most reliable means. *Mr. Boston* responded that the policy should focus on integrating the cost of storage into the market depending upon use, market, and ownership.

Mr. Cavanagh further expanded the discussion on designing a resource-neutral market, asking if this looked like a minimum standard for storage, or is storage itself a portfolio, or part of a portfolio. He commented that the ideal would be a full broad portfolio, but noted that it is still ambiguous in that there is still the need to where to locate it, and the need for compensation for assembling this portfolio.

Mr. Boston disagreed, saying that the market puts the risk on the decision-makers and that the market will encourage resources to be deployed where necessary. Not all states have a one size fits all RES. *Ms. LaFleur* agreed, and that currently FERC is seeing the states having a version of RPS where performance rate base making rewards efficiency.

Mr. Algren stated that the interface between retail and wholesale should be examined more closely. *Ms. LaFleur* added that there is also a need for ancillary services. *Mr. Cavanagh* stated that there is a need for accurate real time prices.

Mr. Cowart delved further into this topic, stating that there is a need to define what is being paid for. Not only should capacity be paid for, but also, "capability"- meaning responsiveness. *Mr. Cavanagh* then questioned whether socializing the cost to complement generation mix at the time or a "capability market" that provides a price signal for storage, demand response, etc, draws out competition in the same way. *Mr. Boston* added that capability is like energy efficiency in that it is hard for the operator to measure or verify it. As such, there is a need for dynamic benefits to be properly valued.

Facilitating the Adoption of Energy Storage

Ms. Reder commented on the planning of energy storage, asking what tools are needed to facilitate the adoption of storage. *Mr. Boston* replied that key to this process would be the location of the energy storage (i.e., geography of natural resource versus the need for storage to be central/local to a city).

Effectiveness of Energy Storage

Brad Roberts asked what the effectiveness of storage is today. He specifically inquired about how new pumped storage projects are different than older energy storage projects, noting that pumped storage

today takes as long to site as a nuclear facility while current capital costs and civil costs have increased since the 1970's. *Mr. Almgren* responded that the value lies in that energy storage does not have to be just one type of backup power, and that there can be multiple uses for it. *Mr. Roberts* responded by noting that only 2% of national capacity is in storage today and, while valuable, there are issues to raising this percentage. *Mr. Roberts* questioned how we would know when we have hit a successful marker.

Discussion on the Potential of Electric Vehicles as Energy Storage

Mr. Butler questioned the on capability of current generation batteries to engage in Vehicle to Grid "V2G" capabilities of dispatching stored electricity back to the grid. *Mr. Butler* stated that currently the focus of manufacturers is on the battery charging, staying charged, and the range of the battery-not technologies in future generations. *Mr. Almgren* commented that this technology is available, but that the dispatching of the battery can shorten its lifespan. He said rather that the focus should be on fleet vehicles and looking more at opportunities than challenges- i.e., more energy efficiency and traditional demand response

Energy Storage Subcommittee

Mr. Masiello, acting as Subcommittee Chair for the Energy Storage Subcommittee, updated the EAC on the activity of the Energy Storage Subcommittee since the March 10, 2011, meeting. The Subcommittee has developed and submitted to DOE two reports. The current task in front of the Subcommittee is drafting the paper on valuation framework for storage. There are two draft documents currently in front of the Subcommittee for this purpose. These documents will be presented in full to the EAC at the next meeting.

ACTION ITEM: FERC provides comments on the draft document detailing existing precedents around gas storage. The EAC will provide comments on the seven policy recommendations posed in Mr. Boston's presentation. Draft documents will be presented in full to the EAC at the next meeting.

EAC Transmission Subcommittee

Mr. Smitherman, acting as Subcommittee Chair for the Energy Storage Subcommittee, updated the EAC on the activity of the Energy Storage Subcommittee since the March 10, 2011, meeting. The Subcommittee reviewed the deliverables that were identified in the 2008 Transmission Adequacy Report and found that those were either done or in the process of being done. The Subcommittee is now addressing the topic of interconnection-wide transmission planning and post-ARRA funding in a draft White Paper.

Discussion on the topics of DOE Grants and Cost Reductions

Mr. Smitherman highlighted the topics that have already been agreed upon by the Subcommittee:

- Cost reductions (telecommuting, webinars, etc);
- The industry should not rely upon further DOE grants or funding.

Mr. Popowsky agreed that post-ARRA funding is unlikely, noting that transmission planning can be furthered in a less costly manner in the future because there not as many start-up costs as incurred to date.

Discussion on Mandatory Planning with Funding through Transmission Tariffs

Mr. Popowsky argued that the state regulatory approach was too unfair in that it would leave out a lot of entities that would otherwise participate in transmission planning, and that it was unwieldy to go through all the state regulatory proceedings, either state by state or utility by utility. *Mr. Popowsky* recommended that bullet number 2 is the best option- a FERC-approved tariff at the transmission level. The model that can be applied is the NERC model using a formula called the net energy for load, which captures every kilowatt hour in the United States once, but only once.

Mr. Kelliher commented that the question was how to apply this model to all stakeholders. He went on to address six possible funding options (including the NERC model)

NERC option:

Mr. Kelliher disagreed with *Mr. Popowsky* and argued that the NERC option would not work because there's no statutory authority, unlike within the NERC model. This means that there is no clause in the U.S. Code that says interconnection-wide planning in the Eastern interconnection gets full cost recovery from everybody.

Regional State Committees (RSC) option:

Mr. Kelliher stated that FERC has allowed this model to be used in the past because it allows for the state participants, the regional state committees, to get their costs of participating in RTO policy formation, not just transmission planning. No stakeholder gets their cost recovery through the RSC model. RSC costs are nominal. However, one major underlying question is if FERC would be comfortable taking on the risk of interconnection wide planning given the previous controversy in Congress over interconnection-wide planning and cost allocation.

Gas Research Institute (GRI) option:

Mr. Kelliher stated that in the GRI model costs were recovered through pipeline tariffs. He noted that the previous logic from FERC was that research and development is related to jurisdictional service, so, therefore, the costs of this can be recovered through jurisdictional tariffs. However, FERC became uncomfortable with this justification and terminated the GRI surcharge. *Mr. Kelliher* explained that

FERC does have the authority to impose an adder or surcharge, but that FERC would have to find that planning is jurisdictional under these circumstances. *Mr. Kelliher* noted that FERC has previously found that planning is an aspect of jurisdictional transmission service, but to say planning by itself is transmission service is not something FERC has ever found. *Mr. Kelliher* commented that a problem with the GRI model arises if no one asks for the planning service. In essence, no one is using the service and as such no one is asking to be charged the tariff rate for planning. This would mean that FERC would have to say their planning can be imposed on every jurisdictional public utility in the eastern interconnection even if no one actually wants the planning to be conducted. Mr. Kelliher noted that a second major problem is that FERC does not have jurisdiction over the whole grid. FERC has jurisdiction over two-thirds of the grid. Thus, the question is how FERC would allocate those costs of planning to that third of the grid without jurisdictional transmission owners.

Joint Board option (Section 209 of the Federal Power Act):

Mr. Kelliher noted a final option, where under the Federal Power Act states can form, and to whom FERC can refer matters to, joint boards composed of state representatives. No other stakeholder could be on the board. This could be an eastern interconnection-wide state board. The costs of that joint board are recovered via FERC's budget, not through tariff adders.

In conclusion, *Mr. Kelliher* commented that the GRI model is not the most likely option. The RSC model would most likely be useful for states, but it would be hard to apply it to other stakeholders. However, one reason the RSC model could work is that the costs are budgeted, and FERC sees them in advance. All models examined by *Mr. Kelliher* were imperfect.

Discussion of other models proposed

Robert Curry offered up an example of New York transmission planning, an "apple to apple" study, planned and vetted by all stakeholders, as a model for post-ARRA transmission planning. *Mr. Curry* proposed that this was a smaller-scale example of *Mr. Kelliher's* last option, the joint board funded by FERC. *Mr. Curry* agreed that this option was the most sustainable, easily funded option.

Mr. Cavanagh further expanded on this option, adding that there is value from in-person interchange among the state participants, public interest participants that does not occur over a video conference or a conference call. *Mr. Cavanagh* called for the EAC to be an advocate for this kind of effort, region-wide initiatives that have everybody involved and the states fully engaged. *Ms. Grueneich* added that when she was a commissioner representative on TEPCC (committee within WECC) planning was a very stakeholder-driven process. *Ms. Grueneich* also questioned the need for a plan to be produced every two years.

Mr. Kelliher responded that it could be possible to create an eastern version of WECC that does planning and each RTO participates, and they fund the effort. *Mr. Krapels* noted a problem with this idea in that some states of New England are beginning to plan their own energy destinies as if energy is a part of economic development policy. Mr. Krapels proposed the NESCO model for New England where the states have appointed a person to be the representative in a region-wide process now beginning to be a

transmission dialog. *Mr. Kelliher* questioned this model, asking how this would work without a sense of common regionality in an area spanning from Georgia to north of Maine.

Discussion on the Amount of Funding Required for Post-ARRA Planning

Mr. Meyer noted that the question of how much funding was going to actually be required was timely but not one that EAC needed to address right away. *Mr. Meyer* suggested that as the valuation framework is developed, it would be beneficial for the EAC to schedule panels with members from the West, East, and ERCOT to talk about their models. The value that the EAC can provide is to give a realistic sense of options and realistic expectations, not necessarily far reaching consensus.

ACTION ITEM: Set an agenda for a future meeting to learn about what is going on in other regional planning processes. The EAC is in agreement that it is not ready now to make a recommendation one way or another on how it would support an interconnection-wide or sub interconnection-wide planning process going forward. The EAC will continue to explore those options.

Discussion on Grid Security

Mr. Heyeck introduced the topic of grid security and grid infrastructure by stating that this topic is important due to current political discussions around high impact low frequency events, solar cycles, and high altitude electromagnetic pulses. *Mr. Heyeck* stated that the Subcommittee had put together a document addressing some of these topic areas of concern in three categories:

1. Grid planning standards: evolving under NERC (i.e., n-1, double contingency) however, this fulfills ordinary, not extraordinary, security.
2. Asset hardening standards: Parts can be replaced as the grid is modernized over the next 20-30 years. Relevant questions include: Can we add security in that for a modest cost? Better insulation for transformers is achievable? How to secure control buildings from electromagnetic events?
3. Sparing of critical components: Relevant questions include how DOE can harden critical load devices and systems.

Mr. Heyeck noted that it is important topic for DOE and DOD and DHS to coordinate on these issues, as the US is ever more dependent on grid today.

Mr. Heyeck opened up the floor for discussion by the EAC.

Discussion on Cross-Cutting Cooperation

David Nevius commented that NERC had established an Electricity Subsector Coordinating Council that developed a strategic plan for critical infrastructure protection with different study groups. He encouraged the Subcommittee to follow NERC's work closely and use it to feed complementarily into the EAC's work.

Ms. Reder added that from a hardening perspective, there have been events on the critical infrastructure level and on the security level. *Ms. Reder* suggested that guidelines or direction provided by the EAC could give organizations such as IEEE, NIST, and NERC and others and some guidelines or direction a place to focus their efforts.

Mr. Lawson cautioned that DOE must be careful to make its work parallel to the work of other stakeholders already in progress.

Discussion of Consumers and Cost Recovery

Mr. Popowsky stated that consumers need to be addressed in this document, especially with respect to DOE engaging NARUC, RTOs, and FERC on cost recovery issues. *Mr. Posposky* encouraged the involvement of NASUCA.

Discussion of Cost Recovery

Mr. Sloan stated that in terms of cost recovery, usually it is the customer who pays. *Mr. Sloan* questioned which was more important to worry about-to be worried about the overall cost to the consumer, or to be stressing system reliability. Building upon this statement, *Mr. Sloan* proposed that the EAC should focus on defining the priorities of maintaining an electric system and working with DOE to establish with other parties timelines or frameworks for accomplishing what issues DOE chooses to prioritize. *Assistant Secretary Hoffman* agreed, stating that the Subcommittee should meet with NERC to reemphasize the previous point on strategic decisions and determining what information is needed, what work needs to be done with respect to hardening and additional work needed to bring clarity and certainty to expectations.

ACTION ITEM: The EAC Transmission Subcommittee continue its work on these issues and coordinate and collaborate with NERC so as to avoid duplication

Discussion on the Interdependence of the Electric System Infrastructure and Natural Gas Infrastructure

Mr. Smitherman started this discussion by noting that the interdependence of electric and natural gas infrastructure is being worked on by NERC and others. He suggested that the EAC not take this on. *Mr. Krapels* disagreed, stating that the EAC should be more proactive and put value on portfolio diversification. *Mr. Krapels* suggested that the EAC could do this through addressing the gas dependence issue.

Mr. Sloan stated that DOE should look at the infrastructure integrity of the existing pipeline system and that there is a need for a deeper analysis- not just analyzing new lines, but looking at old lines and what their lifetime expectancy is. *Mr. Smitherman* agreed that this issue needs more attention. He commented that three points related to this should be examined: First, that there was a general assumption that the U.S. would burn more gas for electricity generation in the future; Second, is the existing system adequate and safe; and thirdly, when electricity curtailment happens as a result of some weather event, oftentimes the natural gas-gathering processing distribution system is turned off, which

further exacerbates the problem. He stated that more information is needed about where those natural gas processing, and distribution, and transportation facilities are because utilities did not know exactly the location as much of it had been developed in the last two years.

Mr. Cowart agreed, noting that given the point made earlier of constraints with gas versus electric generation competition in an inadequate firm capacity, it is appropriate for the EAC to put recommendations in front of DOE.

ACTION ITEM: Edit the draft paper, and present to the full EAC.

Public Comments

Comments from Jimmy Glotfelty, Clean Line Energy Partners

Mr. Glotflety stated that DOE should continue looking into opportunities to use Section 1222 of the Energy Policy Act as a mechanism to build infrastructure. He encouraged the EAC to examine if this is a priority of DOE and if so, to advise DOE on it. *Mr. Gloflety* stated that he believed it was a viable example, modeled after way Path 15 in California. He noted that Section 122 is not meant to solve all of the transmission or renewable integration issues across the country, but that it is one tool in the toolbox *Mr. Gloflety* pointed out that this Section 1222 is especially important to DC lines in the planning process as they do not fit any interconnection structure within the RTOs.

Comments from Praveen Kathpal, AES Energy Storage

Mr. Kathpal stated to the EAC that PPAs are moving energy storage deployment forward. He noted that ninety percent of the wind added in the last two years was through IPPs. Based upon its 30 year history and this fact, *Mr. Kathpal* stated that he believes that this is a viable structure.

He commented that there are benefits that storage brings that are not currently counted in the conventional procurement process. He stated that if RFPs had contemplated storage before they were written, then there would be better evaluation framework for the benefits that storage brings. Until then, the options are to propose energy storage under the capacity and renewable RFPs that are issued seeking PPAs. *Mr. Kathpal* stated that he also believed that there are areas in which federal and state policy can act to improve those processes.

To further this, *Mr. Kathpal* stated that there is a need to be resource-neutral, to fulfill the real need for clean, flexible capacity. *Mr. Kathpal* noted that while there are many mechanisms to add clean energy to the domestic grid, there is a shortage of clean and flexible capacity. To solve this, *Mr. Kathpla* proposed that there is room to add anything to a portfolio standard, to seek sources of clean capacity.

Adjournment

Mr. Cowart thanked the EAC members and other attendees for contributing their comments to the discussion and adjourned the July 12, 2011 Meeting of the EAC at 4:24 pm EST.